What is claimed is:

1. A method for producing a support for planographic printing plates, which comprises a step of roughening at least one surface of an aluminum plate and in which the surface-roughening step includes;

(a) a pre-electrolytic surface-roughening step of electrolytically pre-roughening the surface of the aluminum plate in an aqueous hydrochloric acid solution that contains hydrochloric acid as the essential acid ingredient,

(b) an alkali-etching step of contacting the aluminum plate of which the surface has been electrolytically pre-roughened in the previous pre-electrolytic surface-roughening step, with an alkali solution to etch the aluminum plate,

(c) a desmutting step of desmutting the aluminum plate having been etched in the previous alkali-etching step, with sulfuric acid by contacting the aluminum plate with an aqueous sulfuric acid solution having a sulfuric acid concentration of from 250 to 500 g/liter and an aluminum ion concentration of from 1 to 15 g/liter and having a liquid temperature falling between 60 and 90°C, for a contact period of time falling between 1 and 180 seconds, and

(d) an electrolytic surface-roughening step of processing the aluminum plate having been desmutted in the previous desmutting step, in an aqueous nitric acid solution with an alternating current being applied thereto.

2. The method for producing a support for planographic printing plates as claimed in claim 1, wherein the surface-roughening step includes an etching step of contacting the aluminum plate with an alkali solution to etch the plate, prior to the pre-electrolytic surface-roughening step.

3. The method for producing a support for planographic printing plates as claimed in claim 1, wherein the surface-roughening step includes a mechanical surface-roughening step of mechanically roughening at least one surface of the aluminum plate, prior to the pre-electrolytic surface-roughening step.

4. The method for producing a support for planographic printing plates as claimed in claim 1, wherein the surface roughening step includes;

a second etching step of etching the aluminum plate, of which the surface has been roughened in the electrolytic surface-roughening step, with an alkali solution, and

a final desmutting step of desmutting the aluminum plate which has been etched in the second etching step, by contacting the aluminum plate with an aqueous sulfuric acid solution.

5. The method for producing a support for planographic printing plates as claimed in claim 4, wherein the aluminum plate is so etched after processed in the electrolytic

surface-roughening step that from 0.01 to 5 g/m^2 of its surface is dissolved.

6. The method for producing a support for planographic printing plates as claimed in claim 2, wherein the aluminum plate is so etched before processed in the pre-electrolytic surface-roughening step that from 1 to 15 g/m^2 of its surface is dissolved.

7. The method for producing a support for planographic printing plates as claimed in claim 1, wherein;

an AC electrolytic cell having therein a counter electrode to impart an alternating current to the aluminum plate is used in the electrolytic surface-roughening step, and

the alternating current to be applied to the aluminum plate is so controlled that the quiescent time for which no current flows between the aluminum plate and the counter electrode falls between 0.001 and 0.6 second and that the pulse rise time, Tp, within which the current waveform rises up falls between 0.01 and 0.3 millisecond.

8. The method for producing a support for planographic printing plates as claimed in claim 1, which includes a step of anodic oxidation to form an oxide film on the surface of the aluminum plate of which the surface has been roughened in the

surface-roughening step.

9. The method for producing a support for planographic printing plates as claimed in claim 8, wherein the anodic oxidation step includes a step of making the oxide film formed on the surface of the aluminum plate hydrophilic.

10. The method for producing a support for planographic printing plates as claimed in claim 8, wherein the anodic oxidation step includes a step of sealing micropores that exist in the oxide film formed on the surface of the aluminum plate.

11. The method for producing a support for planographic printing plates as claimed in claim 1, wherein the aluminum plate has an aluminum content falling between 95 and 99.4 % by weight and a silicon content falling between 0.15 and 1 % by weight.

12. The method for producing a support for planographic printing plates as claimed in claim 1, wherein the aluminum plate has an aluminum content falling between 95 and 99.4 % by weight and a manganese content falling between 0.1 and 1.5 % by weight.

13. A support for planographic printing plates, which is

produced according to claim 1.

14. A planographic printing plate precursor, which comprises the support of claim 13 and a photosensitive or thermosensitive plate layer formed on the roughened surface of the support.

15. A method for producing a support for planographic printing plates, which comprises a step of roughening at least one surface of an aluminum plate,

the surface-roughening step includes an AC-electrolytic surface-roughening step of processing the aluminum plate in an aqueous nitric acid solution having a nitrate ion concentration and an aluminum ion concentration of from 5 to 15 g/liter each, and an ammonium ion concentration of from 10 to 300 ppm, and having a bath temperature falling between 50 and 80°C.

16. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the AC-electrolytic surface-roughening step is so controlled that the ratio of the quantity of electricity QA of the alternating current applied to the aluminum plate acting as an anode, to the quantity of electricity QC thereof applied to the aluminum plate acting as a cathode, QA/QC falls between 0.9 and 1, the current duty is 0.5, and the current frequency falls between 40 and 120 Hz.

17. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the alternating current to be applied to the aluminum plate in the AC-electrolytic surface-roughening step is so controlled that the pulse rise time, Tp, within which the current waveform rises up falls between 0.01 and 0.3 millisecond, and the quiescent time for which no current flows through the aluminum plate falls between 0.001 and 0.6 second.

18. The method for producing a support for planographic printing plates as claimed in claim 15, wherein;

an AC electrolytic cell unit which comprises an electrolytic cell containing therein the aqueous nitric acid solution and enabling the aluminum plate to pass through it, a power source for applying an alternating current to the aluminum plate, and a counter electrode disposed inside the cell so as to face the aluminum plate while the plate is electrolytically processed therein, and in which an alternating current is applied between the aluminum plate and the counter electrode to thereby electrolytically roughen the surface of the aluminum plate, is used in the AC-electrolytic surface-roughening step, and

and the AC mode is so controlled that it includes at least once the quiescent time for which no alternating current flows between the aluminum plate and the counter electrode and that

the quiescent time falls between 0.001 and 0.6 second/once.

19. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the surface-roughening step comprises;

a first etching step of contacting the aluminum plate with an aqueous alkali solution to etch the aluminum plate,

the AC-electrolytic surface-roughening step of roughening the thus-etched surface of the aluminum plate, and

a second etching step of further contacting the thus-roughened aluminum plate with an aqueous alkali solution to etch the aluminum plate, in that order.

20. The method for producing a support for planographic printing plates as claimed in claim 19, wherein the aluminum plate is dissolved to a degree of from 1 to 15 g/m^2 in the first etching step, and is dissolved to a degree of from 0.01 to 5 g/m^2 in the second etching step.

21. The method for producing a support for planographic printing plates as claimed in claim 19, wherein the surface-roughening step includes a first desmutting step of contacting the aluminum plate with an aqueous acid solution between the first etching step and the AC-electrolytic surface-roughening step, and includes a second desmutting step

of further contacting the aluminum plate with an aqueous acid solution after the second-etching step.

22. The method for producing a support for planographic printing plates as claimed in claim 19, wherein the surface-roughening step includes a step of mechanically roughening at least one surface of the aluminum plate, prior to the first etching step.

23. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the aluminum plate of which at least one surface has been roughened in the surface-roughening step is subjected to anodic oxidation to thereby form an oxide film on its roughened surface.

24. The method for producing a support for planographic printing plates as claimed in claim 23, wherein the surface of the aluminum plate having the oxide film formed thereon is made hydrophilic.

25. The method for producing a support for planographic printing plates as claimed in claim 23, wherein the anodic oxidation step includes a step of sealing micropores that exist in the oxide film formed on the surface of the aluminum plate.

26. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the aluminum plate has an aluminum content falling between 95 and 99.4 % by weight and a silicon content falling between 0.15 and 1 % by weight.

27. The method for producing a support for planographic printing plates as claimed in claim 15, wherein the aluminum plate has an aluminum content falling between 95 and 99.4 % by weight and a manganese content falling between 0.1 and 1.5 % by weight.

28. A support for planographic printing plates, which is produced according to claim 15.

29. A planographic printing plate precursor, which comprises the support of claim 28 and a photosensitive or thermosensitive plate layer formed on the roughened surface of the support.

30. A method for producing a support for planographic printing plates, which comprises a surface-roughening step of electrolytically roughening an aluminum alloy plate in an acid solution with an alternating current applied thereto, and a step of processing the plate for anodic oxidation, wherein;

the electrolytic surface-roughening step includes a step

of using an AC waveform that takes a pulse rise time falling between 1.5 and 6 milliseconds before it rises from its base (0) to its peak.

31. The method for producing a support for planographic printing plates as claimed in claim 30, wherein the aluminum purity of the aluminum alloy plate falls between 95 and 99.4 % by weight.

32. The method for producing a support for planographic printing plates as claimed in claim 30, wherein the aluminum alloy plate contains at least five metals of the following:

Fe: from 0.3 to 1.0 % by weight,

Si: from 0.15 to 1.0 % by weight,

Cu: from 0.1 to 1.0 % by weight,

Mg: from 0.1 to 1.5 % by weight,

Mn: from 0.1 to 1.5 % by weight,

Zn: from 0.1 to 0.5 % by weight,

Cr: from 0.01 to 0.1 % by weight, and

Ti: from 0.03 to 0.5 % by weight.

33. The method for producing a support for planographic printing plates as claimed in claim 30, which includes the following steps, before and/or after the electrolytic surface-roughening step:

(1) an alkali-etching step of processing the aluminum alloy plate in an aqueous alkali solution to etch the aluminum plate to a degree falling between 1 and 15 g/m^2;

(2) a desmutting step of desmutting the alkali-etched aluminum alloy plate in an acid solution.

34. The method for producing a support for planographic printing plates as claimed in claim 33, wherein the alkali-etched aluminum alloy plate is desmutted by processing the plate in an acid solution having an acid concentration of from 250 to 500 g/liter and an aluminum ion concentration of from 1 to 15 g/liter, at 60 to 90°C for 1 to 180 seconds.

35. The method for producing a support for planographic printing plates as claimed in claim 33, wherein the aluminum alloy plate is mechanically roughened on its surface, before it is processed in the alkali-etching step.

36. The method for producing a support for planographic printing plates as claimed in claim 30, wherein the aluminum alloy plate is, after processed for anodic oxidation, further processed for surface pore sealing and/or for making the surface hydrophilic.

37. The method for producing a support for planographic

printing plates as claimed in claim 30, wherein the surface of the aluminum alloy plate is activated before it is electrolytically roughened.

38. A support for planographic printing plates, which is produced according to the method of claim 30.

39. A planographic printing plate precursor, which is fabricated by forming an undercoat layer having a dry weight of from 0.001 to 1 g/m^2, a positive or negative photosensitive layer having a dry weight of from 1 to 3 g/m^2, and a mat layer having a dry weight of from 0.001 to 1 g/m^2, in that order on the surface of the support of claim 38.

40. The planographic printing plate precursor as claimed in claim 39, which has a surface roughness (Ra) falling between 0.3 and 0.6 μm, a value L* falling between 50 and 95, and a delta Eab* of at most 2.

41. An aluminum plate for planographic printing plate supports, which has an aluminum content of from 95 to 99.4 % by weight and is produced in a rolling process, and which, when measured in point of the number of the strains at its machine-direction (MD) edges and of the height of the strains according to a process comprising the following steps (a) to

(d):

(a) cutting the aluminum plate in the direction nearly perpendicular to the machine direction thereof,

(b) putting the thus-cut aluminum piece on the flat or curved, sample-receiving face of a sample stand,

(c) pressing the aluminum plate against the sample-receiving face of the stand so that the center part of the aluminum piece around the center line thereof that runs in the machine direction is firmly stuck to the sample-receiving face of the stand throughout the overall length of the aluminum piece in the machine direction, and

(d) measuring the aluminum piece thus on the stand, in point of the number of the waved edge strains per the unit length of each edge and of the height of each edge strain,

satisfies the conditions that the number of the MD edge strains thereof is at most 3.334 per meter of each edge, the maximum height of the edge strains is at most 2 mm, and the total height of all the edge strains is at most 2.666 mm.

42. The aluminum plate for planographic printing plate supports as claimed in claim 41, which is so profiled that its center part is thick and the area around its edges is thin, and of which the cross section is so controlled that the value a and the value pc defined by the following equations are at most 1 % and at most 2 %, respectively:

$a = h/c,$

$pc = c/t_{max},$

wherein $h = t_{min} - t_{edge}$; $c = t_{max} - t_{min}$; t_{max} = the maximum thickness of the center part of the aluminum web; t_{min} = the minimum thickness of the aluminum web; t_{edge} = the thickness of the edges of the aluminum web.

43. The aluminum plate for planographic printing plate supports as claimed in claim 41, which has a silicon content falling between 0.15 and 1 % by weight.

44. The aluminum plate for planographic printing plate supports as claimed in claim 41, which has a manganese content falling between 0.1 and 1.5 % by weight.

45. The aluminum plate for planographic printing plate supports as claimed in claim 41, which is so defined that the degree of its bending in the machine direction is at most 0.3 mm/4 m.

46. The aluminum plate for planographic printing plate supports as claimed in claim 41, which is so defined that the height of the burrs at its edges is at most 10 μm.

47. A support for planographic printing plates, which is

produced by roughening at least one surface of the aluminum plate of claim 41.

48. The support for planographic printing plates as claimed in claim 47, of which the roughened surface is subjected to anodic oxidation to thereby form an oxide film thereon.

49. A method for inspecting aluminum plates for planographic printing plate supports, which comprises;

(a) a step of cutting a rolled aluminum plate in the direction nearly perpendicular to the machine direction thereof,

(b) a step of putting the thus-cut aluminum piece on the flat or curved, sample-receiving face of a sample stand,

(c) a step of pressing the aluminum piece against the sample-receiving face of the stand so that the center part of the aluminum piece around the center line thereof that runs in the machine direction is firmly stuck to the sample-receiving face of the stand throughout the overall length of the aluminum piece in the machine direction, and

(d) a step of measuring the aluminum piece thus on the stand, in point of the number of the waved edge strains per the unit length of each edge in the rolling direction, and of the height of each edge strain.

50. The method for inspecting aluminum plates for

planographic printing plate supports as claimed in claim 49, wherein the sample stand is a level table of which the sample-receiving face is flat.

51. The method for inspecting aluminum plates for planographic printing plate supports as claimed in claim 49, wherein one or more weights are put in the center part of the sample set on the sample-receiving face of the sample stand, covering the overall length of the sample in the machine direction thereof, and the sample is firmly pressed against the sample-receiving face of the stand by those weights.

52. The method for inspecting aluminum plates for planographic printing plate supports as claimed in claim 51, wherein each weight is set on the sample to be inspected in such a manner that the outer side edge of the weight put on the sample is inside the adjacent side edge of the sample by 0.1w to 0.3w, with w indicating the width of the sample.